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(71) Applicant and
(72) Inventor: KRISTIANSEN, Einar [NO/NO]; Sandalsloen 55, N-4022 Stavanger (NO).

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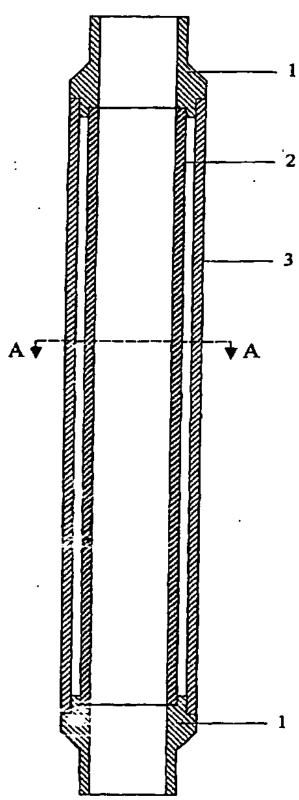
(54) **Title:** CASING WITH ISOLATED ANNULAR SPACE



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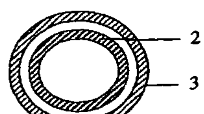

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(57) Abstract: The invention is comprised of (see fig. 1) an inner pipe (2), and an outer pipe (3), and two end subs (1). An isolated circular hollowed space is contained in between these components. The isolated space can be used for transport of different medias down into the well, this can be vacuum, air, gas, acids, solids, tracers, or other well stimulating medias. The end subs (1) can be connected to the casing in the well and become an integrated part of the casing. The invention can be cemented on the outside like the casing can. The invention can be perforated after installed in the well.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

CASING WITH ISOLATED ANNULAR SPACE

The invention is related to a casing with isolated annular space.
The invention can be applied in wells that are drilled for production of hydrocarbons.
The invention can be installed and used as an integrated part of the casing that is penetrating a reservoir, or a zone in the well that shall perforated.

Wells that are drilled in conjunction with production of hydrocarbons are drilled in sections, starting with the biggest diameter at the top. Normally, a casing is installed in each section after the hole is drilled. Each casing is normally cemented in place. The deepest section in the well will normally penetrate the zone of interest, which is the reservoir that will produce hydrocarbons, or the zone that it is planned for injection of water or gas. A casing will also normally be installed and cemented in place across the zone of interest.

Communication between the reservoir and the well bore is normally obtained by the use of perforating guns. The perforating guns are normally tubular loaded with many explosive charges that is shooting radial holes through the casing and cement and several feet into the reservoir rock. All charges are detonated at the same time.
One of the challenges related to the perforating technology is to remove the perforating debris from the perforating tunnels after the perforating operation. Debris left in tunnels will lead to excess fluid friction during production that could lead to lower production rate as a result. One effective method for cleaning the perforating tunnels to perforate in "under balance". This is done by changing out the well bore fluid with a low density fluid to lower the well bore pressure to a level that is lower than the pressure in the reservoir prior to perforating. This pressure differential between the reservoir and the well bore will lead to an immediately flow of fluid into the well when the casing is perforated. The result is a relatively high flow rate that will clean the perforating tunnels.
There are methods available today for achieving similar cleaning effects without having to lower the well bore pressure. One method is to use atmospheric chambers in the perforating guns that also are perforated at the same time as the casing. The chambers will fill immediately due to the relatively high hydrostatic pressure. The filling of the atmospheric chambers will create an "under balance" in the well that will give similar cleaning effect as obtained by changing out the well bore fluid.

This invention is based on using atmospheric chambers. The difference from the described methods is that chambers are an integrated part of the casing. The chambers are penetrated and punctured when perforating the casing. This is described in claim # 1 in this application.

The invention is described in following figures;

Fig. 1a shows a longitudinal cut of a preferable way of designing the invention, consisting of an inner pipe (casing) and an outer pipe (casing) that is connected by two end subs.

Fig. 1b shows a cut of a preferable way of designing the invention.

Fig. 1a shows a longitudinal cut of an alternative way of designing the invention, with support rings between inner pie and outer pipe.

Fig. 2b shows a cut of an alternative way of designing the invention.

The invention consists of an inner pipe (1,2), and an outer pipe (1,3), and two end subs (1,1). In between these components there is an isolated, circular space that can be used for transport of different media into the well, this can be vacuum, air, gas, different solids, acids, tracers, or other well stimulating medias. If the invention is exposed to high collapse forces during the installation, support rings (2,4) can be installed. The end subs can be connected to the casing in the well such as the invention becomes an integrated part of the casing. As the invention is a part of the casing, it can also be cemented in place on the outside in the same way as for the casing.

One challenge in the perforating technology is to clean out perforating debris from the perforation tunnels.
This invention can help clean out or stimulate the perforating tunnels immediately after the perforating.
The perforating gun shoots from inside the invention, through the invention, and out into the formation/reservoir that is on the outside of the invention, leading to that the invention get punctured. If the isolated space is filled with air or gas that has a lower pressure than the formation, the space will immediately fill up with fluid from the formation. This immediately filling will give a washing effect in the perforating tunnels.
If the isolated space is filled with an acid that reacts with the reservoir rock or perforating debris, the acid could flow into the perforating tunnels and give a stimulating effect immediately after perforating if the pressure in the well bore is higher than in the reservoir.

Claims

1. Casing with isolated annulus space **characterised by** that is comprised of an inner pipe (2), and a outer pipe (3), two end subs (1), and in between these components an isolated, circular hollowed space that is used to transport different medium down into the well, the medium can be vacuum, air, gas, solids, fluids, tracers, or other well stimulating medias **characterised by** that the medias are released by perforating the casing.

2. Casing with isolated annulus space as described in claim 1, **characterised by** that it can be installed a an integrated part of the casing in the well.

3. Casing with isolated annulus space as described in claim 1, **characterised by** that vacuum, air, or gas is transported in the isolated space down into the well.

4. Casing with isolated annulus space as described in claim 1, **characterised by** that well stimulating fluids are transported in the isolated space down into the well.

5. Casing with isolated annulus space as described in claim 1, **characterised by** that scale inhibitors are transported in the isolated space down into the well.

6. Casing with isolated annulus space as described in claim 1, **characterised by** that support rings (2,4) are installed in the isolated space to avoid collapse due to pressure differentials.

7. Casing with isolated annulus space as described in claim 1, **characterised by** that a solid material that is transformed into gas when perforating is installed in the isolated space.

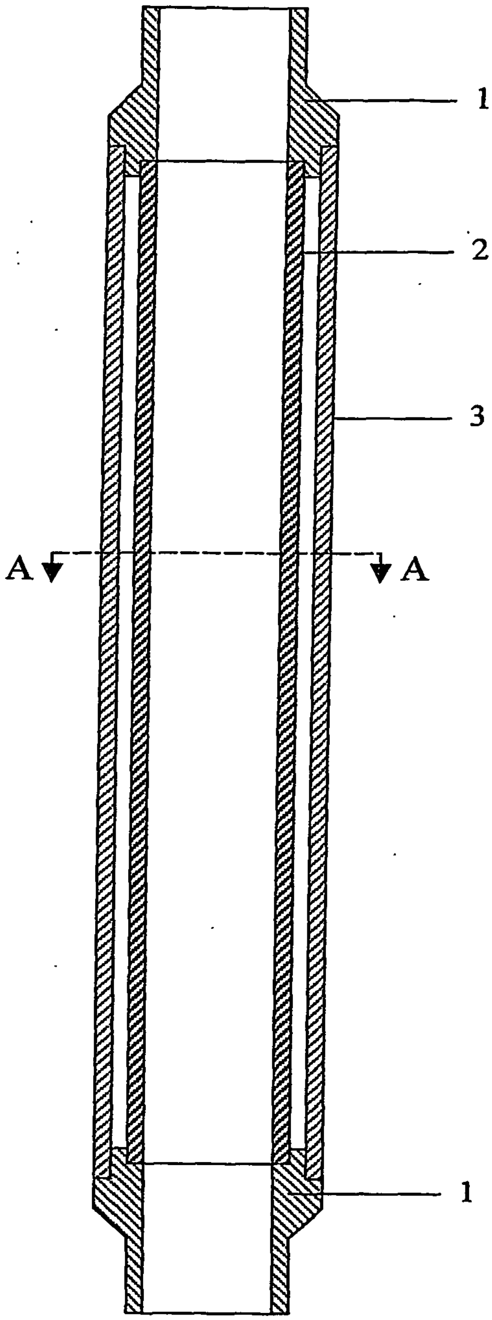

Fig. 1a

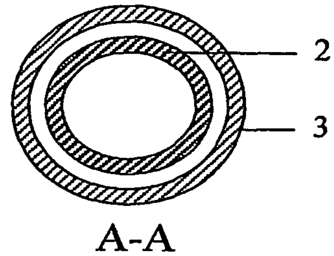

Fig. 1b

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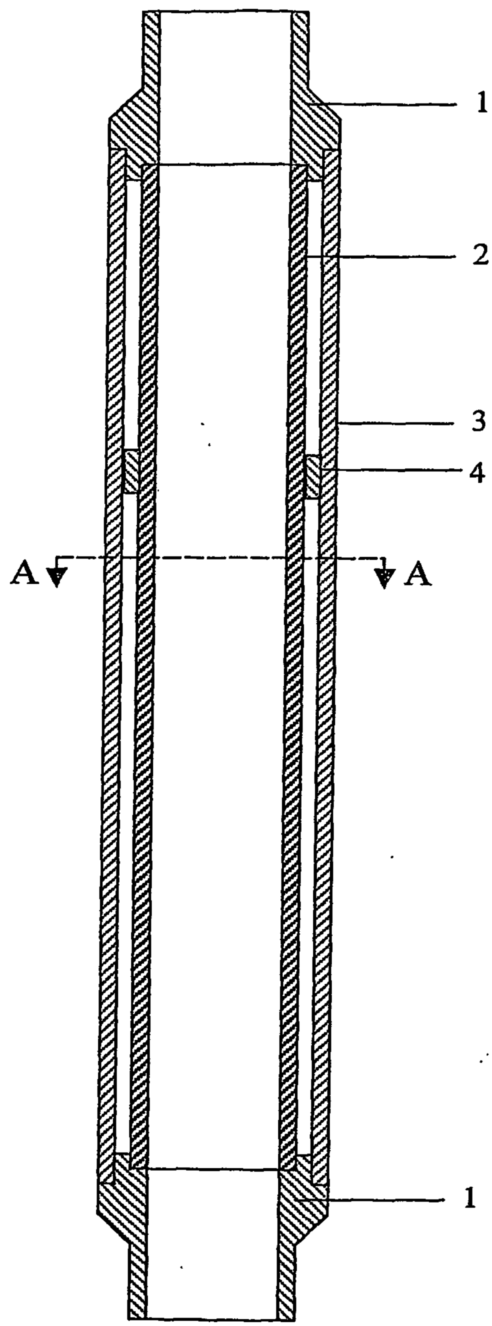

Fig. 2a

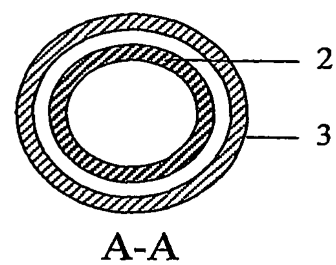

Fig. 2b